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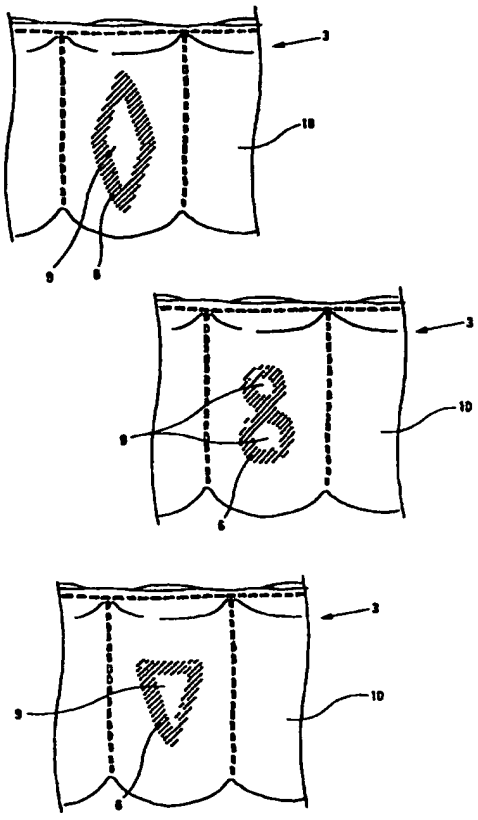
(54) Title: METHOD AND MEANS FOR THE PRODUCTION OF A SPRING INSERT

(57) Abstract

According to the invention, a spring insert for example for a mattress (1) is produced from strings (3) of pocket springs which are provided with an adhesive (6) comprising one or more narrow, continuous glue strings, so that the adhesion permits unhindered axial movement of the springs, and that the adhesive will glue the individual springs together both at the middle as well as the sides, so that the spring strings can be glued together both in a line and while mutually displaced. According to the invention, the adhesive can be applied from a number of nozzles (19) in the form of a broken line of glue (11) which, when the spring (10) has passed all of the nozzles, constitutes a continuous string of glue (6) which surrounds a field (9) which is without glue. This glue application results in an advantageous production capacity, since the nozzles can be programmed for the formation of the glue string while the spring string (3) moves past the nozzles (19). Hereafter, the spring string is conveyed further to make contact with a preceding spring string with which it is glued together.



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METHOD AND MEANS FOR THE PRODUCTION OF A SPRING INSERT

Prior art technique

The invention concerns a method for the production of a spring insert, for example for use in a mattress, said spring insert comprising strings of springs which are individually enclosed within material pockets, so-called pocket-springs, and where the strings are moved passed a gluing head with glue nozzles for the application of adhesive on the side of the individual springs, and subsequent gluing together of adjacent spring strings, and also a means for the execution of the method.

The most widespread form of spring inserts are at present spring inserts made up of so-called pocket-spring strings which are held together in parallel rows by means of an adhesive. Normally, the production takes place in automatic plants where both the pocket-springs and their positioning and sticking together take place in a continuous production process.

An example of such a plant for the production of spring inserts is known from the description of EP 0 624 545 A1. After shortening to the desired lengths, the individual spring strings are moved past a glue application section, where an adhesive is applied to the individual pockets in such a manner that adjacent spring strings can be glued together when they are placed opposite one another.

There can hereby be produced spring inserts where the individual strings are placed with their pockets in a straight line, so that gluing take place along the outermost of the pocket sides.

To achieve the best possible gluing together and spring

function, it is important that the gluing is carefully and suitably dimensioned. A gluing technique is known from the description of EP 0 154 076 A2, where the gluer applies limited amounts of glue to the individual pocket, either in the form of lines or points. It is hereby ensured that the springs can move relatively freely in the axial direction. However, the gluing together is not always of adequate strength due to the dispersed placing of the adhesive.

A second technique is known from EP 0 421 496 A1, where the adhesive is applied as a coating which covers the individual pockets from uppermost to lowermost on the outer side around the centre. However, this gluing technique has a restrictive influence on the axial movement, even when a flexible adhesive is used.

Moreover, where both of the above-mentioned publications are concerned, and herewith the gluing methods, these are intended for the gluing together of pocket-spring strings which are placed with pockets which are in line.

This imposes an upper limit for the diameter of these pockets, since too great a diameter will result in a relatively large area between four pockets where there is no springing. This limits the maximum pocket diameter. Conversely, the diameter can not merely be reduced, the reason being that the spring effect will then become inadequate.

Since the demand on the the spring insert is that it has suitable resilience, and at the same time that it is uniform and possibly comprises spring strings with different spring strengths, there will be a need for a method for the production of spring inserts whereby these demands can be fulfilled in an expediaent manner.

Advantages of the invention

According to the invention, by producing the spring insert by applying the adhesive to the sides of the pocket-springs in a pattern consisting of one or more continuous, narrow glue strings, where each glue string surrounds a field without adhesive, there is achieved a surprisingly strong gluing together without any reduction in resilience, since the material will be able to fold together during compression when the springs are loaded. The glue pattern thus results in a double, continuous string of glue in the axial direction, which cannot be torn open by normal loading of the spring insert.

Moreover, one and the same method can be used for the gluing in the known manner with pocket on pocket, as well as in a compact manner where the individual pockets are introduced in the space between two pockets on the adjacent string. There is hereby achieved a very compact and at the same time uniform structure of the spring insert, which provides the possibility of increasing the pocket-spring diameters. This will be a great advantage, the reason being that there are hereby provided several possibilities of choice in the dimensioning of the spring inserts.

The application and positioning of the adhesive are such that an optional gluing together of the individual spring strings can be effected. For example, it is hereby possible for an extra resilience to be achieved by placing the spring strings close together where, for example, the load is greatest, while in the edge area of the mattress a more dispersed holding-together of the spring strings can be used.

As disclosed in claim 2, by forming the adhesive in a pattern of several continuous glue strings, a uniform gluing together of the whole contact surface between two or

more spring pockets, with good axial resilience and herewith spring freedom, is ensured with a relatively limited consumption of adhesive.

As disclosed in claim 3, by using a gluing head for the execution of the method with programmable valves for the supply of glue to the individual nozzles, glue can be supplied to different places during the movement of the spring string past the gluing head. This ensures a high rate of glue application and herewith high production speed.

As disclosed in claim 4, by being able to set the nozzles in relation to the springs, the application of the glue and the positioning is adjusted in accordance with the product and its characteristics.

As disclosed in claim 5, by mounting the nozzles in rows, the outermost nozzles can be placed in relation to the extent that the glue string shall have in relation to the extent of the springs.

As disclosed in claim 6, by mounting several rows of nozzles, more strings of glue can be applied and the application capacity can herewith be increased.

Finally, as disclosed in claim 7, it is expedient to adjust the nozzles to be able to apply glue to several springs at a time, in that it will hereby be possible to build up a string of glue over a relatively long piece of spring string, which at a given speed of application ensures a high feeding speed and herewith high production capacity.

The drawing

An example embodiment of the method and the machine's exe-

cution of the method will be described in more detail in the following section with reference to the drawing, where

fig. 1 shows a section of a mattress with a spring insert according to the invention,

fig. 2 shows a method of gluing the spring inserts together,

fig. 3 shows a second method of gluing the spring inserts together,

fig. 4 shows an example of an adhesive pattern,

fig. 5 shows a second example of an adhesive pattern,

fig. 6 shows a third example of an adhesive pattern,

fig. 7 shows an example of a machine for the production of a spring insert,

fig. 8 shows the gluing head during the application of glue, and

fig. 9 - 20 schematically show an application cycle using eight nozzles in a row.

Description of the example embodiments

In fig. 1 is shown a section through a spring mattress 1 comprising an outer bolster 2, a number of pocket strings of adjoining pockets 10, each consisting of an outer material holster 4 in which a spring 5 is inserted. The material pockets are welded together along the springs' top and bottom and are separated from each other by a weld ex-

tending parallel with the axes of the springs between the top and bottom welds in the formation of the material pocket.

These spring strings 3 are produced in a commonly-known production plant, where they are cut off in suitable lengths corresponding to the length or the breadth of the spring insert. Hereafter, an adhesive is applied to the outside of each pocket in a pattern, examples of which are shown in figs. 4-6.

In fig. 4 is shown a spring string 3 seen from the side with a pocket 10 on which an adhesive 6 has been applied in the form of a narrow, continuous string of glue, with an inner, non-adhering field 9 which extends across the middle of each pocket 10. This is the most simple form of adhesive pattern.

In fig. 5 is shown a pattern with two connected glue strings 6 with two non-adhering fields 9, which provides a good adhesion in the height of the individual pockets 10.

Finally, in fig. 6 is shown a triangular glue pattern which is characterized by a good adhesion in the horizontal direction at the baseline, and from here a decreasing extent in breadth.

Other glue patterns can be envisaged, but all of the examples shown will be able to fuction satisfactorily in the holding together of spring strings in different ways.

As will appear from fig. 3, the holding-together can consist of longitudinal spring strings 3. The adjacent pockets 10 are held together along their centres by glue joints 6 to the extent that the glue 6 has in both height and breadth.

The known spring inserts can be produced in this way.

However, spring inserts can also be produced with springs inserted as shown in fig. 2. The glue pattern 6 here has a horizontal extent such that it is possible to carry out a gluing together at two points 6 when the strings 3 are brought together with a displacement of half the pocket diameter. This provides spring inserts of a very compact structure, and the possibility is provided of being able to use springs 5 with larger diameters, since the distance between the individual pockets is reduced to a minimum.

A plant for the execution of the method according to the invention will now be described with reference to figs. 7-20.

In fig. 7 is shown an example of a plant seen from the side. The introduction of the spring string takes place from the right, where a so-called pull-in arrangement 13 with a feeding belt pulls a pre-determined number of springs into the cutting-off unit 14.

This unit 14 comprises a vertically-extending cutting arrangement and also welding equipment for the welding together of the cut-off ends.

The now cut-off part constitutes the spring string which is to serve as the element in the finished spring insert.

Hereafter, a conveyor 15 comprising one or two endless belts over vertical turning rollers at the ends leads the spring string past the gluing head 12 with glue nozzles 19 and valves 20 for the application of glue, which is described in more detail in the following.

After the glue has been applied to the one side of the spring string, this is conveyed further to the compression unit 16, where a horizontally-moving press-head presses the spring string with the glue against a second spring string for the sticking-together, and herewith the building-up of the spring insert.

When a given number of such spring strings have been glued together, the spring insert is finished.

The plant is controlled, programmed, in such a manner that the whole of the method is executed as a continuous process, in that a stop occurs only at the cutting-off unit 14 and while the press-head 16 is in operation. The application of glue at the gluing head 12 is carried out during the passage of the spring string.

There is hereby achieved a very rational production with the continuous sequence from the spring string to the finished spring insert.

The means for the execution of the method comprises a gluing head 12 which will be described with reference to fig. 8.

As shown, the spring string 3 comprises a number of springs 10, which in the drawing are moved towards the left.

In the example shown, the gluing head itself is mounted on a stay 17 on the plant. A holder 18 is fixed to the stay 17 for the securing of the actual glue application unit in an adjustable bracket.

This glue application unit comprises a number of nozzles 19, each of which is connected to a valve 20.

In the example shown, there are thus mounted eight nozzles and valves. As will be seen, this row of nozzles is positioned at an angle and secured in relation to the spring string 3 so that the outermost nozzle 19 (1) and 19 (8) are positioned at the desired distance from the upper and lower extent of the spring string.

Where a designation is used for the nozzles 19, the figure in brackets indicates the number of the nozzle, where the nozzle furthest to the right is designated 19 (1) and the nozzle furthest to the left is designated 19 (8).

The glue is normally one which can be melted by heat, and which under pressure is fed to the valves 20 via a hose stub 21 through a not-shown hose.

When a valve 20 is activated, controlled by not-shown software via cables 22, the glue is fed to the nozzle 19 which sprays a controlled amount out on the spring lying opposite the nozzle.

By appropriate activation of the eight valves 20, on each spring it is possible to build up a continuous, narrow string of glue 6 around a field 9 which is without glue.

By appropriate control of the individual valves and positioning of the nozzles in relation to the spring, the form, extent and positioning of the string of glue can be determined for achieving the desired gluing-together of the individual spring strings. It is thus possible to vary the glue application during the building-up of a spring insert, whereby special demands regarding the gluing-together can be fulfilled.

An example of such a programmed control of the glue application is illustrated in figs. 9-20. In each figure there

is marked a spring 10 in a spring string 3, which is the same in all figures in the feeding cycle illustrated.

Below the spring string 3 there is drawn the glue fragment 11 which the nozzle/nozzles 19 have applied to the spring/springs 10 and which is marked with an enlarged blob on the gluing head. Also here, the spring string moves from right to left in a sliding movement.

In fig. 9, the lowermost nozzle 19 (1) deposits a blob 11 in the middle of the spring 10.

In fig. 10, the nozzle 19 (2) deposits an elongated blob 11, in that the valve is held open a little longer.

In fig. 11, the nozzles 19 (2) and 19 (3) respectively deposit an elongated and a smaller blob 11, and in fig. 12 the nozzle 19 (4) deposits a blob 11.

In fig. 13, the nozzle 19 (3) deposits a blob 11, and in fig. 14 the nozzle 19 (1) also deposits a blob on the subsequent spring.

In fig. 15, the nozzles 19 (4) and 19 (2) each deposit a blob on two springs.

In fig. 16, the nozzles 19 (6) and 19 (2) deposit a blob on the two springs, and in fig. 17 the nozzles 19 (5) and 19 (2) deposit a blob on the two springs.

In fig. 18, the nozzles 19 (7) and 19 (4) deposit a blob on the springs, and in fig. 19 the nozzles 19 (6) and 19 (7) respectively deposit a small and a larger blob on the spring, while the nozzle 19 (3) deposits a blob on the subsequent spring, and the nozzle 19 (1) on the next subsequent spring.

Finally, in fig. 20 it is shown how the nozzle 19 (8) deposits a final blob 11 on the spring 10 in the conclusion of the glue string 6. Furthermore, the nozzle 19 (4) deposits a blob on the subsequent spring and the nozzle 19 (2) deposits a blob on the next subsequent spring.

Hereafter, this application cycle is repeated, in that the first blob shown in fig. 13 is to be found again in fig. 9.

As will appear from the above, the string of glue is formed by a continuous addition of glue in the desired amount and position, and the glue runs together in the formation of an unbroken string of glue 6 on the side of each spring 10.

By suitable positioning of the nozzles, it can be programmed, for example, to apply glue only on each second spring, or a need can be envisaged for a further glue pattern on the spring, for example in the formation of two rings or the like on each spring.

C L A I M S

1. Method for the production of a spring insert for use, for example, in a mattress, said spring insert comprising a string of springs which are individually enclosed within material pockets, so-called pocket-springs, and where the strings are moved past a gluing head with glue nozzles for applying adhesive on the side of the individual springs and subsequent gluing-together of adjacent spring strings, c h a r a c t e r i z e d in that the adhesive (6) is applied to the sides of the pocket-springs (10) in a pattern consisting of one or more narrow, continuous glue strings (6), where each glue string surrounds a field (9) which is without adhesive.

2. Method according to claim 1, c h a r a c t e r i z e d in that two or more of the glue strings (6) are connected with each other.

3. Means for the execution of the method according to claims 1 and 2, c h a r a c t e r i z e d in that the nozzles (19) are assembled in a gluing head (12) with associated valves (20), said valves being programmable for the control of the application of glue during the movement of the spring strings (3).

4. Means according to claim 3, c h a r a c t e r i z e d in that the nozzles (19) are assembled on a holder (18) which can set the nozzles (19) in relation to the springs (10).

5. Means according to claims 3 and 4, c h a r a c t e r i z e d in that the nozzles (19) are mounted in a row, and such that the outermost nozzles are positioned within the uppermost and lowermost extent of the glue string (6).

6. Means according to claim 5, c h a r a c t e r i z e d in that there is more than one row of nozzles.

7. Means according to claims 5 and 6, c h a r a c t e r i z e d in that the row of nozzles (19) has such an extent that they can apply glue (11) to several adjoining springs (10) at a time.

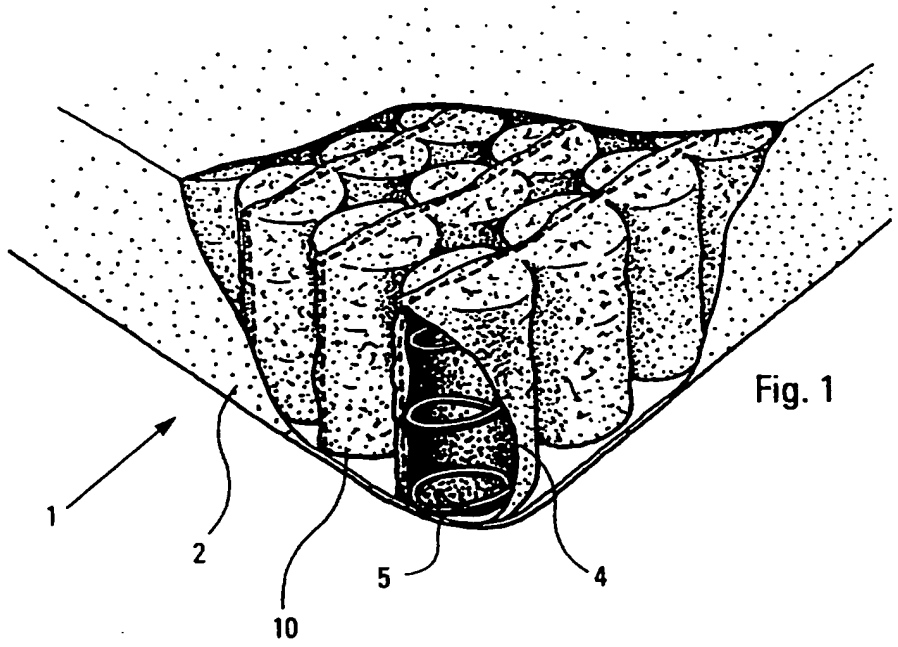


Fig. 1

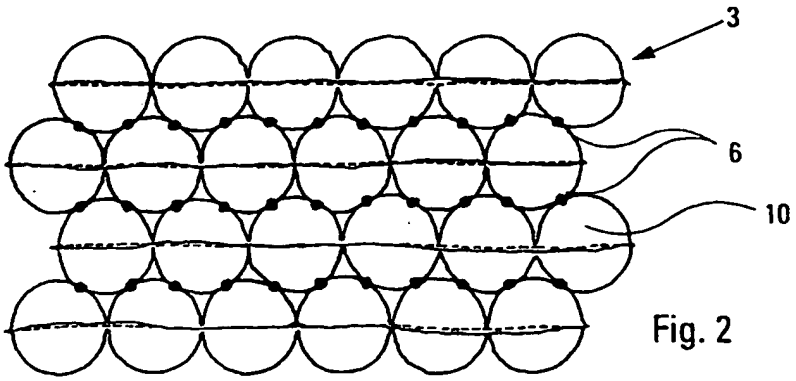


Fig. 2

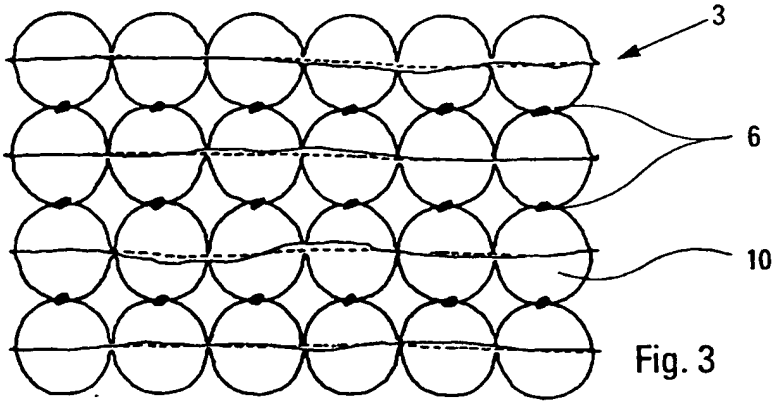


Fig. 3

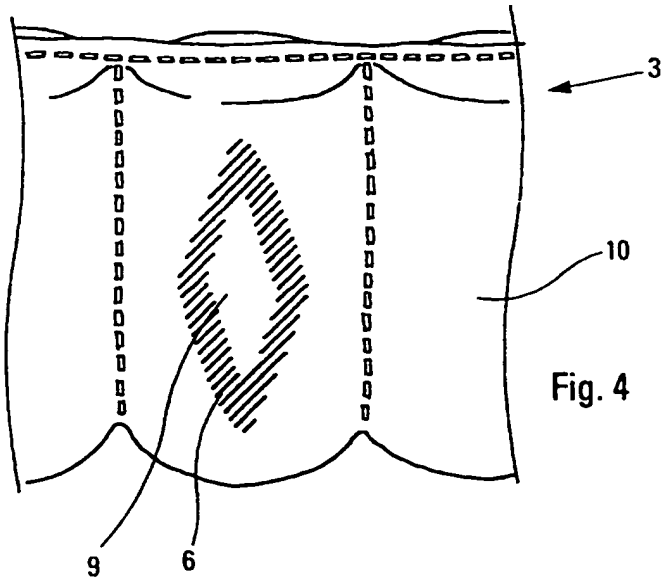


Fig. 4

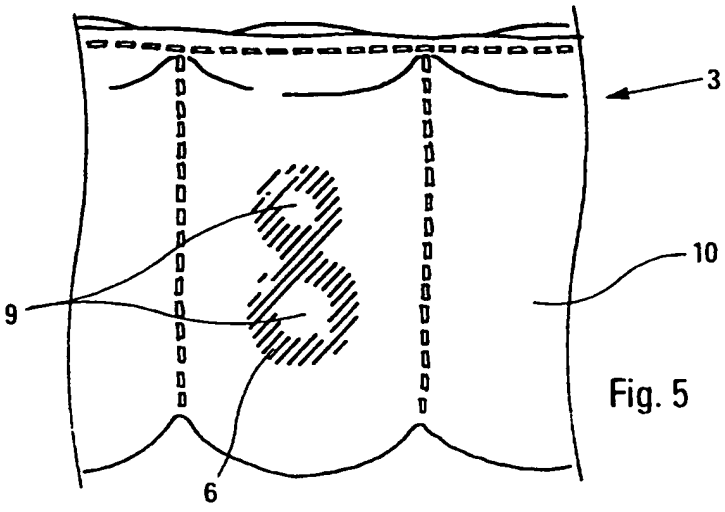


Fig. 5

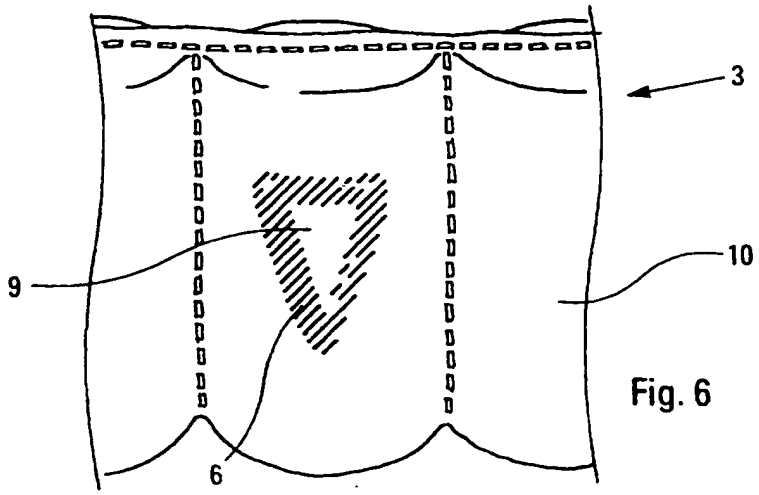


Fig. 6

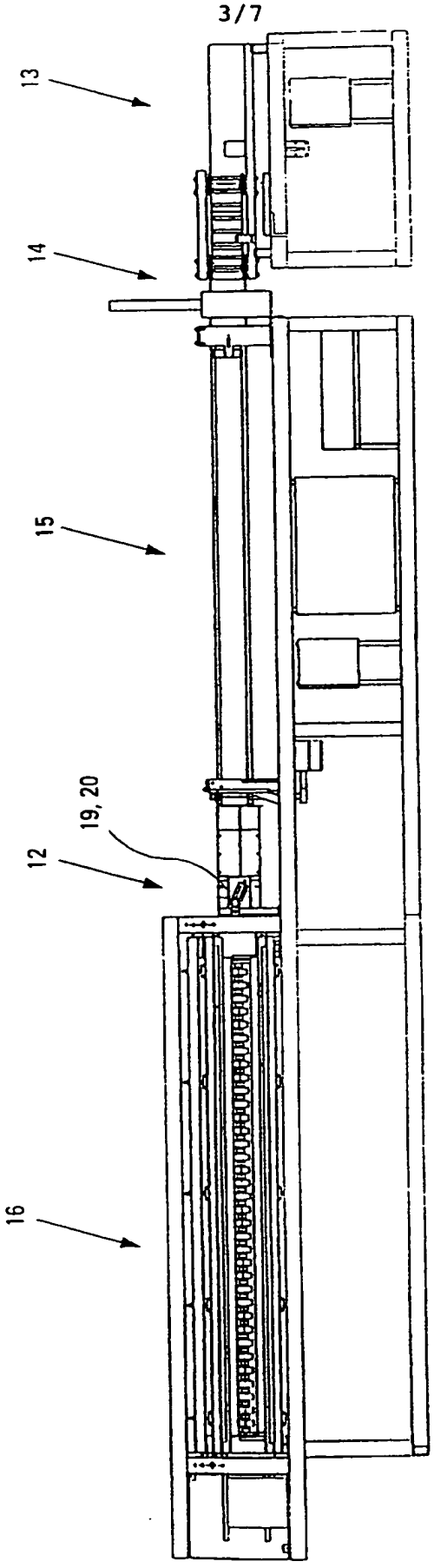


Fig. 7

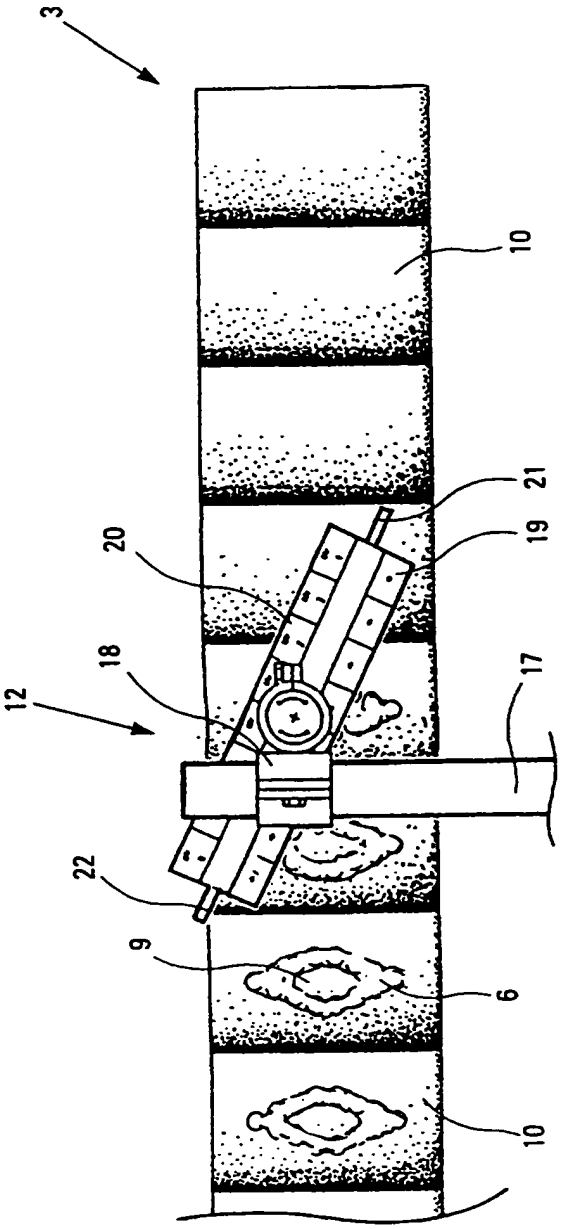


Fig. 8

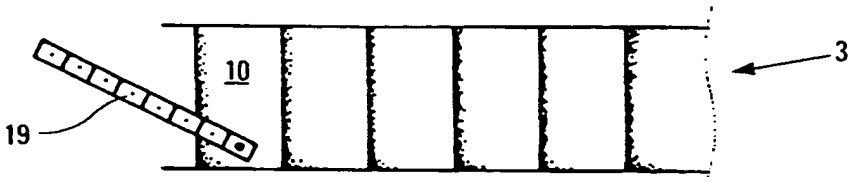


Fig. 9

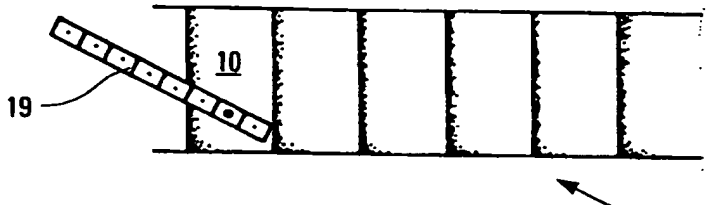


Fig. 10

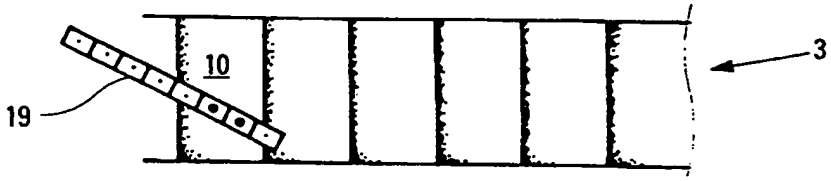


Fig. 11

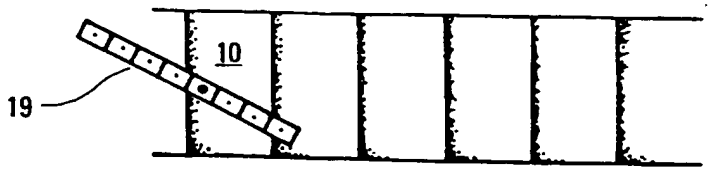


Fig. 12

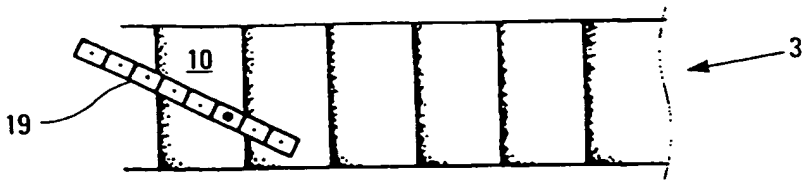


Fig. 13

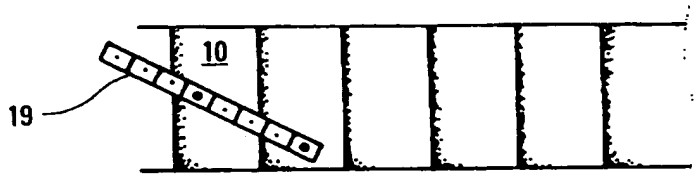
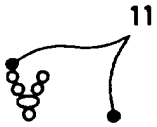


Fig. 14



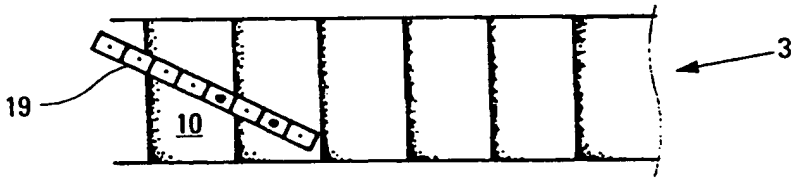


Fig. 15

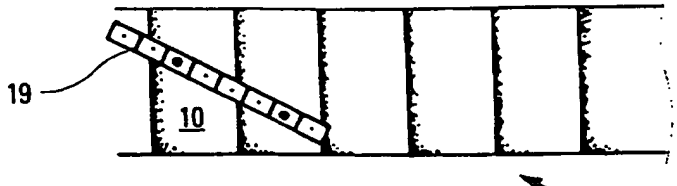
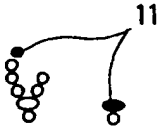


Fig. 16



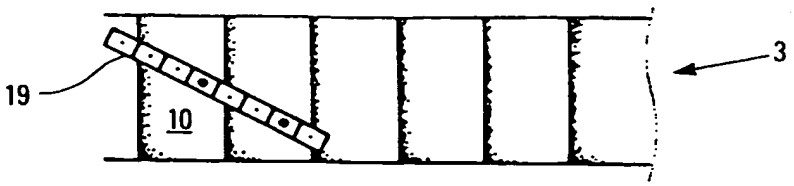
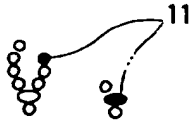


Fig. 17



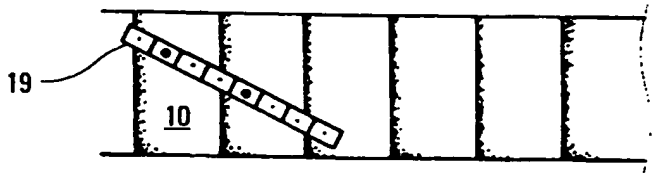
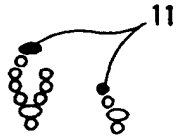


Fig. 18



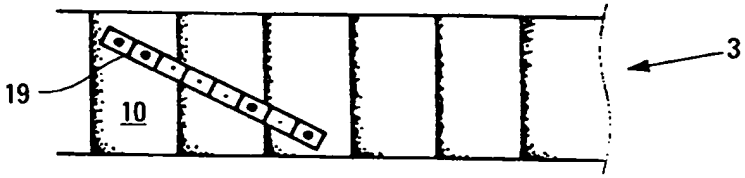
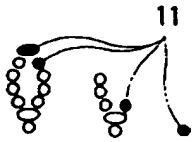


Fig. 19



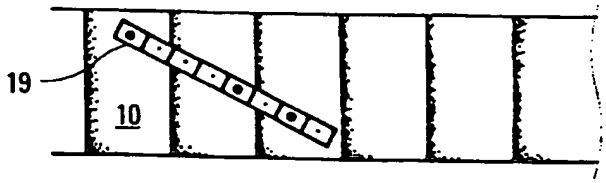
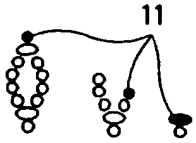


Fig. 20



INTERNATIONAL SEARCH REPORT

International application No.
PCT/DK 97/00144

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A47C 27/04, B68G 9/00
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: A47C, B68G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A		3-7
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X	US 4566926 A (W. STUMPF), 28 January 1986 (28.01.86)	3-7
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X	EP 0421495 A1 (B'LINEA), 10 April 1991 (10.04.91)	3-7
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X	EP 0624545 A1 (TOLEDO FJEDERINDLAEG A/S), 17 November 1994 (17.11.94)	3-7
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☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
1 July 1997	19 -07- 1997
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Sven-Erik Bergdahl Telephone No. +46 8 782 25 00

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INTERNATIONAL SEARCH REPORT

Information on patent family members

03/06/97

International application No.
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